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PAPERS OF THE CONFERENCES

Held in connection with Pt. [illegible] no 13

The Great International Fisheries Exhibition

ARTIFICIAL CULTURE
OF
LOBSTERS

BY

W. SAVILLE KENT, F.L.S., F.Z.S.

Late Assistant in the Natural History Departments of the British Museum

AUTHOR OF "A MANUAL OF THE INFUSORIA," AND OF OFFICIAL GUIDE-BOOKS
TO THE BRIGHTON, MANCHESTER, AND WESTMINSTER AQUARIA

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LONDON
WILLIAM CLOWES AND SONS, LIMITED
INTERNATIONAL FISHERIES EXHIBITION
AND 13 CHARING CROSS, S.W.

International Fisheries Exhibition

LONDON, 1883

ON THE

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International Fisheries Exhibition,
LONDON, 1883.

CONFERENCE ON MONDAY JULY 23, 1883.

JOHN TREMAYNE, Esq., in the Chair.

ON THE ARTIFICIAL CULTURE OF LOBSTERS.

ONE of the most important objects of the Conference held in connection with the International Fisheries Exhibition is, I anticipate, to elicit data that may be utilised for the improvement or resuscitation of our many fishing industries already established, and for the opening up of new fields that may give employment to the fishing community, and increase the supply of wholesome food for the use of the masses.

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Taking this for granted, I here propose to submit to you the results of some practical experiments made on my part some few years since, in connection with the artificial cultivation of lobsters, trusting that the deductions I have arrived at with relation to the same may contain, at least, some crude ideas that may be hereafter fashioned into shape and prove of utility to the public.

The lobster, I need scarcely remark, occupies a front position in the ranks of our food fishes. Its intrinsic value, weight for weight, is little inferior to that of salmon, while its nutritive and restorative properties as an article of diet, are, in accordance with the latest dictum of the medical faculty, vastly superior. An idea of the inadequacy of the supply of this crustacean, obtained in British waters, to meet the public demand, may be gained from the statistics contained in the Government Report upon the Crab and Lobster Fisheries, published in the year 1877. Herein it is shown that, upon an average, no less a number than one million of lobsters are imported annually into the United Kingdom, in the living state, from Norway alone, which is the chief source of our supply, this million, at the date quoted, representing a money value of about £22,500.

Statistics are likewise here given of the numbers of lobsters annually derived from different portions of the British coast line, the keynote and burden of the whole report being, however, the unwelcome, but only too familiar intelligence, that lobsters are continually becoming scarcer and dearer, and that the fishermen have, year by year, to go further afield, dividing the large profits, once accruing to the few, among the many, to meet the requirements of the market. The lobster, not many years since within easy reach of all members of the community, is in fact rapidly following the lead of the native oyster, and threatens soon to be a luxury at the disposal only of the wealthy. A quotation from the report already referred to will suffice to establish this assertion. Here is the testimony we find on many a page. England and Wales: "Crabs and lobsters are decreasing; they are overfished." "The grounds in-shore have been fished out, and the men have to go to deeper water." Scotland: "A very large majority of the witnesses, with special means of arriving at a just conclusion on the subject, are satisfied that the crab and lobster fisheries of Scotland are in a state of gradual decay." Of Norway, our richest source of supply, a Mr. Fisher, one of the Billingsgate salesmen most extensively engaged in the Norwegian lobster trade, gives evidence thus:—"The supply has fallen off during the last seven years. Ten or twelve years ago he used to import 600,000 lobsters a year from Norway, from three districts only. He is now working six districts, double the amount of coast, and the six districts only produced last year from 400,000 to 500,000 lobsters." Other evidence elicited by the Commissioners resulted in their verdict that "there is little room left for doubting that there has been a very serious falling off in lobsters in Norway."

The causes that have contributed towards the decadence of the lobster fisheries generally are relegated in the report to three distinct categories. 1. The overfishing of the inshore districts. 2. The destruction of undersized fish. 3. The consumption of the eggs or spawn for culinary purposes. For the second only of the evils thus summarised—that of the destruction of undersized fish—has a remedy been actually applied, and beyond doubt with highly beneficial effects, through the appointment for lobsters of the eight-inch gauge, fish within which length, by the Act 40 and 41 Vict. c. 42, 1877, are now of illegal size. The suggestion of a close time for lobsters during their spawning season, to prevent overfishing and to protect their eggs, has not been found practicable, since it would, in the first place, interfere unjustly with the inherited rights of the fishermen, while, in the second instance, it would interrupt the supply at the period when lobsters are, as an article of food, in their very best condition.

Assuming for the time that both the protection of the undersized young and that of the adults, during the spawning season, had become binding by law, I feel justified in asserting that we should have, even then, only arrived half way towards the root of the evil, and that the prime factor in the decadence of our lobster fisheries is to be found in the permitted wholesale destruction of the lobster's spawn. Comparing matters with the law as it now exists, with relation to the trout and salmon fisheries, the foregoing regulations, if enforced, would, in fact, leave us in precisely the same position as obtained with these important industries prior to the introduction of the artificial system of cultivating and protecting the eggs and fry of the Salmonidæ. To all who have given attention to this subject it is a well-known circumstance that, but for the introduction of the artificial system of culture on the part of patriotic pisciculturists, our lakes and rivers would never have recovered from the exhausted condition to which they had been reduced by overfishing. Now, what has been achieved in connection with the Salmonidæ I am prepared to maintain is capable of realization with the lobster tribe. That lobsters may be artificially cultivated from the egg I have already proved by practical experiment on a small scale, and to demonstrate that the same principles applied upon a wholesale one might be utilized for re-stocking our exhausted inshore fisheries is the chief object of this communication.

In order to place you fully in possession of the circumstances and capabilities of the subject introduced, it is desirable that I should give you a brief sketch of the early life-history of the lobster. As is familiar to all present, the eggs of the lobster, upon extrusion, are attached in masses to the filamentous appendages, or " swimmarets " of the abdomen, or so-called " tail " of the lobster, and constitute what is popularly named the " Berry." The amount of eggs extruded by the female fish, it is singular to observe, coincides remarkably with those of the salmon, numbering from 20,000 to 30,000. Attached beneath the parent's abdomen, in the form of " berry," the eggs remain for a period of three or four months, and then the young are hatched. No nutritive or other than a purely mechanical relationship subsists all this time between the parent and its egg-clusters, the passing of its small brush-like claws among them to rid them of any extraneously derived substances, and the occasional fanning motion of its swimmarets to increase the stream of oxygenated water through and among the eggs, representing the sum-total of attention they receive.

The young animals that issue from the eggs of the lobster are distinct in every way, including shape, habits, and mode of locomotion, from the adult. If, on the contrary, they were born like their parent, they would at once sink to the bottom of the water in the immediate neighbourhood of their birthplace; the area of their distribution under such conditions would be extremely limited, and through close interbreeding, it may be anticipated that the stock would become materially deteriorated. Nature, here, however, as in the case of the great majority of marine invertebrate animals, has provided her offspring with special facilities for becoming distributed to long distances, their bodies being so lightly constructed that their specific gravity scarcely exceeds that of the fluid medium they inhabit, while they are additionally provided with long feather-like locomotive organs, with which they swim at or near the surface of the water. As such essentially free-swimming, pelagic animals, they now spend the entire first month or six weeks of their existence, in which time, it is scarcely necessary to state, they may be carried by the tides and currents many miles away from their place of birth. During this interval, however, the little lobsters by no means retain their primitive shape; their delicate chitinous skins, the rudiment of the future shell, is constantly getting too tight for them, and is thrown off to give place to a larger and looser one, that differs each time in many structural points from its predecessor. As determined by my own experiences, such a changing of the skin, or "ecdysis," as it is technically termed, is effected no less than half a dozen times before the little animal arrives at the ambulatory condition, and takes upon it the form and features of the parent. This chapter in the life-history of the young lobster is of the most interest, perhaps, when studied by aid of the recently kindled, but ever-increasing, light of the doctrine of evolution. In its onward progress towards the form and proportions of a typical lobster it is thereby found to pass through conditions that in former times were regarded as distinct animals belonging to less highly organised groups of the crustacea than the parent animal.

Thus, when liberated from the egg, the little crustacean, designated a "Zoea," has no abdominal appendages, and swims through the water by means of the external branchlets, or "exopodites" of its thoracic limbs, and in this respect resembles the so-called Opossum Shrimp (*Mysis*) referable to the order Schizopoda. This condition is maintained through several successive skin-castings, or ecdyses, the abdominal appendages, or swimmarets, however, gradually developing, and the thoracic swimming organs becoming simultaneously reduced. At or about the sixth cast these last-named structures have entirely disappeared; the little animal swims through the water with the aid only of its abdominal swimmarets, and is to all intents and purposes a small prawn (*Palæmon*). The internal elements, or "endopodites" of the primarily bifid thoracic limbs have, meanwhile, developed into true legs, so that, after the manner of a prawn, the young lobster can either walk upon the ground or swim in midwater. It is with the next ecdysis only that the animal becomes a typical lobster, restricted to an ambulatory mode of existence, or capable of spasmodic translation only through the water in a backward direction through the flapping action of its spreading tail. Did we trace back the developmental phases of the lobster to a period before it had left the egg, we should find that for a while it represented a much lower type than an Opossum shrimp, or prawn, it having then but three pairs of jointed appendages, and corresponding in this respect with what is known as the primitive larval or "nauplius" condition of all crustacean life.*

Interesting as these developmental phenomena of the lobster are shown to be, the chief object of my bringing them before your notice is to impress upon you the fact that, during the first three or four weeks, at least, of its existence, the lobster is so small and helpless, and so exposed to surrounding perils, that a very infinitesimal percentage only of each liberated brood can hope to run the gauntlet of its numerous enemies, and to settle down to the bottom of the sea as an ambulatory lobster. Gregarious shoals of full-grown fish, such as herrings, atherines, and sand-eels, subsist almost exclusively upon pelagic crustacea, be they the adult phases of smaller species or the larval conditions of larger types, such as crabs and lobsters ; while the young of almost every fish that swims, in addition to a host of marine invertebrate animals, are addicted to a similar diet. The risks that a lobster runs during the first few weeks of its infancy, are, in fact, as great, or, indeed, greater than those encountered by a young salmon, in its native streams, during its egg and "alevin" conditions.

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* The several growth-phases of the common lobster as here described have, on all substantial points, been likewise independently observed in France by M. Gerbe, in Norway by Professor Sars, and of the American variety by Mr. S. J. Smith.

Now all present will, I think, admit that that day on which it was found possible to protect and rear these infant salmon, until they were fit to shift for themselves and be turned into the river, constituted the turning-point in the downward career upon which our salmon fisheries, up to within a comparatively recent date, had entered. But for this discovery, that the eggs and young of the Salmonidæ might be artificially reared and protected, and in spite of all rules and regulations concerning a close time and the protection of undersized fish that had been established, our best salmon and trout streams would by this time have been literally ruined.

Now, gentlemen, the very important proposition that I have to submit to your consideration is, that the eggs and young of the lobster are, as compared with the salmon, equally susceptible of artificial cultivation, and you will agree with me, I think, if I can substantiate this statement, that the resuscitation and restocking of our exhausted lobster fisheries are brought within, at least, a measurable distance of accomplishment. Nothing short of evidence of the most practical description will, I am aware, assist me in substantiating the position I have undertaken, and such evidence I will now place at your disposal. At many of the large public Aquaria with which in former years I have been associated as naturalist, berried lobsters have brought forth their progeny in the tanks. On most of these occasions the fate of the little lobsters has been to either perish for want of suitable nutriment or to be eaten up by the other fish. Notably, however, in the year 1875, at the Manchester Aquarium, I observed of a newly-hatched brood that they assembled like a cloud of gnats and fed freely upon the finer particles of minced fish thrown into the water as food for the ordinary occupants of the tanks.

It was the observation of this phenomenon that suggested the possibility of rearing them artificially. Examples were accordingly removed, placed by themselves, and fed at regular intervals with the food for which they had displayed a partiality, the upshot being that a considerable number of them were reared through the several metamorphoses previously described, and until, in fact, they had become fully formed ambulatory lobsters measuring about one inch in length. Specimens of these little lobsters thus artificially reared I have the honour to submit to you.

It remains for me to state that the experiment, thus brought to a successful issue, was accomplished in the roughest and rudest manner. The little animals were merely placed, a number together, in glass jars having each a capacity of about one quart, the sea-water contained in them being simply changed each morning. Such crude efforts on a small scale being rewarded with success, it is not only probable but it may be maintained as a reasonable and logical deduction, that the culture of young lobsters on a very much larger scale, and with the aid of all those perfected appliances and experiences that have been brought to bear upon the hatching and rearing of Salmonidæ and other fishes, would be easy of achievement. The period during which the young lobsters would require attention, dating from the time of their exclusion from the egg until they attain to the ambulatory state, is represented by an interval of but a month or six weeks, and the amount of food each individual lobster will consume in that time does not exceed one or two ounces. The ambulatory state arrived at, the little animal, though not exceeding an inch in length, is perfectly fit to shift for itself, and, like a young trout or salmon of the same size, on being consigned to the water immediately goes to the bottom and seeks to hide itself beneath the stones or any suitable shelter that may present itself.* The rearing of lobsters in thousands instead of in tens or units would, it is needless to assert, be but a matter of augmented apparatus, and what the results would be upon our depopulated lobster grounds if several thousands, or rather millions, of such young animals could be turned out upon them annually, those are best qualified to record a verdict who have already had practical experience in the cultivation of Salmonidæ.

Certain details respecting the suggested culture of lobsters on an extensive scale, and having such a practical end in view as the restocking or improvement of our home fisheries, may now be proceeded with. In the first place, the simplest method of obtaining the young lobsters to be reared is doubtless to keep the berried hens in suitable ponds or tanks until the young are liberated from their eggs. This process, though a sure one, necessarily entails the feeding of the adult fish for a period of several months while their eggs are ripening, and this expense, in my opinion, might be avoided. As explained in an earlier paragraph of this Paper, the relationship maintained between a female lobster and her eggs is a purely mechanical one, for the purpose of securing their protection, aeration, and freedom from extraneously derived substances until the young are hatched. Now all these conditions could be as efficiently secured by an artificial system of culture, almost precisely identical with that which has been brought to bear so successfully upon the cultivation of the eggs of the Salmonidæ and other fishes. The eggs of the lobster might be similarly spread out upon trays or grids, allowing the free percolation of well-oxygenated water, and intelligent supervision being at hand in the same way to remove all dead examples or other deleterious matters. Or nature itself would be yet more nearly imitated if the groups of eggs, numbering many hundreds, as attached to the swimmarets of the parent, were bodily removed, and by some simple device suspended in grape-like clusters within the midst of the circulating currents. The young lobsters being hatched, they will be found to thrive best in deeper receptacles where they will have abundant room to swim. The font-like rearing troughs introduced by Mr. Oldham Chambers, F.L.S., the goblet-shaped glasses utilised by the Canadian pisciculturists, but more especially the larger glasses on the "intermittent syphon system" and other hatching receptacles for floating spawn made use of by the United States Fisheries Commission, may be cited as being particularly suitable for lobster rearing.* Feeding the young brood is obviously a mere matter of mechanical detail, finely-minced fish or mussels being the most convenient pabulum. Whatever is decided on, due attention must be paid to the food being supplied abundantly and regularly, otherwise they will fight and devour one another. The well-known pugnacity and reputed cannibalistic tendencies of lobsters and other crustacea has been supposed by some to present an insuperable obstacle to the cultivation of lobsters in quantities. Where, however, an abundant supply of other food is forthcoming it will be found that they prefer it to their own species; and I need hardly remark that cannibalism where animals are reduced to a state of starvation is not, as a moral attribute, monopolised by the crustacea.

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* Although not frequently obtained close to shore in this very early ambulatory condition, my friend Mr. Henry Lee, F.L.S., tells me that he has, many years ago, taken such little lobsters, having an average length of from one to one and a half inches, in the neighbourhood of Shanklin, Isle of Wight.

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* I here take the opportunity of acknowledging the kind courtesy shown me by Mr. Earle of the United States Fisheries Commission in introducing and explaining to me the very complete collection of hatching and rearing tanks exhibited on behalf of the United States Government in their department of the International Fisheries Exhibition. Such inspection, it may be added, resulted in that gentleman's concurrence with my own opinion, that the receptacles on the "intermittent syphon system" were especially adapted for lobster culture.

Once reared through to the ambulatory condition the little lobsters are fit for liberation in their native element, and here care must be exercised in the choice of the ground upon which they are turned out. That of a flat sandy nature affording no shelter, and where they would be speedily sought out and devoured by their numerous enemies, should be avoided. Rocky ground, which is their natural haunt and from whence, as is well known, the most abundant supply of lobsters is derived, is that on which they should be set free. Arriving at the bottom of the water they will, as previously observed, immediately seek for a suitable crevice wherein to hide themselves, and this having been met with it is adopted as their permanent abode, to which they will constantly retreat after their sorties in search of food, which are usually made at night. This selection by lobsters of a definite dwelling place is a well-known circumstance to fishermen and others practically acquainted with the habits of marine animals. It may be cited as an additional encouragement to those who may be tempted to embark upon the industry of lobster culture, since the lobster being a sedentary or home-staying type, those who sow the pasture lands of the sea with this particular crop may likewise from the same ground reasonably hope in the process of time to reap the fruit of their labours.

If the scheme here proposed of rearing both the eggs and young of the lobster should be found capable of practical application, it may be hopefully anticipated that a check will at length be given to that most pernicious practice of utilising the spawn or berry of the lobsters for culinary purposes. Tens or even hundreds of millions of lobster eggs, each egg representing a potential lobster, are thus wastefully consumed in this country year after year. The late Mr. Frank Buckland, who was one of the most strenuous protesters against this wanton destruction of lobster spawn, thus writes, in the year 1875, in his "Report upon the Fisheries of Norfolk"—"It must be evident that the destruction of so many lobsters in the form of eggs must of necessity greatly tend towards producing the scarcity of lobsters which is now being felt in the London and other markets." As an illustration of the quantity of lobster eggs that are used by the cooks who must and will have it for colouring fish sauces and for decorative purposes, it will be found stated in the same Report that—no less than from 14 to 18 lbs. of lobster spawn have been supplied by a single collector in this manner for culinary purposes during the two months of April and May. The number of eggs contained in this mass of spawn amounted at the very least, in Mr. Buckland's estimate, to 1,720,320, and this figure represents, it must be borne in mind, but an unimportant fraction of the sum total that is consumed for a like purpose throughout the realms of the United Kingdom. Now, what would be thought of the individual who advocated or carried into practice the utilisation of the eggs of the salmon for a similar purpose* : would any term of opprobrium that might be levelled against him be considered too strong or any punishment too severe? And yet, precisely such a disastrous policy is in the case of the lobster freely sanctioned and approved, without let or hindrance, every day in the year. A remedy for this long-acknowledged evil has been suggested on many sides in the form of the proposition that the sale of berried lobsters should be made illegal. Such a suggestion, however, if carried into practice, could be easily evaded by the fishermen, who would simply remove and throw away the spawn before bringing the animals to shore. If, however, the cultivation of lobsters from the egg should be developed as a practical industry, there is every reason to believe that a stop would be speedily put to the wholesale destruction of their eggs that is now being carried forward. If the expression of public opinion should prove insufficient to bring about so desirable a result, the supply of eggs at present only flowing to the saucepans of the cooks might be diverted to the hatcheries of the cultivators through the offer, if need be, of a better price than they are at present commanding as a mere condiment for sauce. As a matter of fact, it is simply for its decorative effect and not as a flavouring agent that the article is in such demand by our West End *chefs*, and surely in these days of discovery and invention the chemists might come to our aid with some harmless and yet equally brilliant pigmentary substance, that being utilised as a substitute would remove all further necessity for the present lamentable destruction of embryo lobsters.

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* I am informed, on good authority, that salmon spawn, cooked and eaten after the manner of green peas, is not an altogether unknown delicacy in certain parts of Ireland.

The question that remains to be considered is as to whether lobster culture in the manner here suggested might be prosecuted with pecuniary advantage by private individuals, or whether it is a subject adapted only for the intervention of the State. It is certainly scarcely to be anticipated that many private persons will be found sufficiently philanthropic to undertake the restocking of our exhausted lobster grounds for the benefit of the fishing commonwealth. Nevertheless, there are many large landowners with estates bordered by a rocky coast-line, who would doubtless welcome the opportunity of thus placing at their tenants' disposal the means of materially augmenting their source of income. To those among this category who have had practical experience in trout and salmon hatching, this subject of lobster culture might be especially recommended upon several grounds. The routine in either case will be very similar, while a large portion of the apparatus constructed for salmon hatching might be utilised for lobster culture, and moreover would be empty and available for use just at the time when the lobsters commence to spawn.* To other nations besides our own it may be anticipated that this proposed plan of hatching and rearing lobsters would be found advantageous. By way of illustration, reference may be made to the arduous efforts that were instituted in the United States, and notably by Mr. Livingstone Stone, to transport the lobster across the continent from the Atlantic to the Pacific seaboard where it was previously unknown. Experiments in every instance were made with adult lobsters, involving the employment of bulky apparatus, great expense, and many failures before even a small amount of success was obtained.* If, in place of this, recourse had been had to young fry that had arrived at the ambulatory state, and were just ready to transfer to the sea, thousands might have been successfully transported in less space and at less cost. Better results still would, probably, have been arrived at if the eggs only, detached from the females, had been carried across to the Pacific coast, and a hatchery for their development and the rearing of the fry been established contiguous to the shore on which it was proposed to set them free.

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* Mr. Frank Gosden, pisciculturist to the Duke of Wellington, has imparted to me within the last few days a very interesting piece of information that bears upon the subject of lobster culture. He tells me that for some time past, during the summer months, he has with great success devoted the troughs utilised in winter and spring for hatching trout, to the rearing of newly-hatched freshwater crayfish. Lobster rearing on the same principle he considers would be equally feasible. It is perhaps desirable to mention here that the river crayfish has not, like the lobster, a free-swimming or Zoea phase, but enters upon the ambulatory condition immediately it leaves the egg. The treatment required for the two animals would therefore not be precisely parallel.

Although practical attention has not hitherto been directed to the artificial culture of lobsters from the egg on the system here advocated, experiments have been made both in this country and in France and Norway to establish parks and enclosures for the cultivation or storage of the adult animals. In all these cases, however, so far reported, the results obtained have not been encouraging, the outlay required to keep up the supply of food leaving no margin for profits. It is still, nevertheless, an open question whether or not in certain favourable situations where a food supply could be obtained at a minimum cost, the culture of adult lobsters might not be developed into a remunerative financial enterprise. It may be remarked in this connection that fish condemned as unfit for human food is, to the average amount of one ton per day, sent away for destruction from the metropolis of London alone. Now the lobster, as is pretty generally known, is particularly partial to stale fish, and when supplied with fresh food in the tanks of an aquarium, is, unless greatly pressed by hunger, in the habit of burying it until it has arrived at an advanced state of decomposition. It is evident that a very small portion of the fish above referred to that is destroyed daily in this metropolis, and which might be had for the cartage, would suffice to feed many thousand lobsters, and might be converted into that highly esteemed crustacean at a considerable profit to the cultivator. The object of this Paper is not, however, to advocate the cultivation of adult lobsters, but expressly that of establishing hatcheries for the development of the ova and young, for the purpose of replenishing or restocking our much exhausted fisheries.

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* According to the latest Report, p. 10 of the Descriptive Catalogue of Economic Crustacea, &c., of the United States, in the Great International Fisheries Exhibition, London, 1883, the attempts made to transport lobsters to the Californian coast have been entirely unsuccessful. Such failure may probably be attributed to the small number of individuals that ultimately survived and were distributed at their port of destination.

In this direction it may, I think, be predicated that lobster hatching and rearing is hereafter destined to occupy a prominent position in the science of pisciculture, and if conducted with any approach to the perseverance, intelligence, and ingenuity that has been already concentrated upon kindred branches of the fishing industry, cannot fail to achieve an equally signal and complete success.

DISCUSSION.*

Mr. KENNETH CORNISH, after some remarks on the value of fish as food, having particular reference to a paper read by Sir Henry Thompson at a previous Conference, was going on to describe an improved method which he had adopted for cooking fish, when he was reminded by the Chairman that the special subject of the Conference that day was crustaceans. He said he would not detain the meeting, but had also devised a method for preserving fish in the form of powder, by which the whole of the nutritive constituents were preserved, including the albumen.

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* The following discussion and motions carried refer in part to a Paper that was read the same afternoon by Mr. T. Cornish, on the subject of Crustacea generally.

Mr. BIRKBECK, M.P., then moved a vote of thanks to Mr. Cornish and to Mr. Saville Kent for their interesting papers, which had contained a deal of information which was probably new to many persons present. Mr. Cornish had told them of a remarkable fishing ground on the coast of Cornwall, which might be safely fished without any restrictions, whilst on the other hand Mr. Saville Kent had given statistics proving that the supply of lobsters was apparently decreasing rapidly. He might say that on the coast of Norfolk there was a small lobster and crab fishery on a ground of about fourteen miles in length by three to four miles in breadth, which many years ago was a very productive fishery, but unfortunately the practice of breaking up small crabs for bait, and also the practice of sending to market berried hen lobsters, was carried on to such an extent that the fishery was reduced really to nothing. He was asked to institute a Board of Trade inquiry, and the late Mr. Buckland and Mr. Spencer Walpole came down and held it; the result being that an order was passed putting a stop to the capture of berried hen lobsters and also the soft crabs, and the fishermen were strongly advised to stop the breaking up of small crabs for bait. That order was in force for three years, and when it expired, which was on the 1st of February this year, another inquiry was held by the Board of Trade, under the supervision of Professor Huxley. The evidence which was given, not only from the fishermen, but the salesmen, was so convincing as to the effect of the order being to increase the supply to four or five times what it was previous to the order being passed, that the Board of Trade had now passed an order putting a stop to the practices which were in vogue for ten years, and the fishermen had made up their minds that they would endeavour to get a local Act passed to put a stop entirely to the breaking up of small crabs. That showed what could be done in a small district, and he hoped it would be carried out throughout the country.

Mr. BRADY had much pleasure in seconding the resolution. He did not know that there was any question more interesting than that of crab and lobster fisheries, unless it was the artificial cultivation and production of salmon and trout. He quite agreed with Mr. Saville Kent on the great importance which would be derived from the artificial cultivation of these fish in the same way as salmon and trout, but he did not follow him so far as to think that the same instruments or conveniences could be used for one as were used for the other, inasmuch as one must be carried on near the sea, and the other far inland. With regard to the crayfish, he agreed with him it could be done, but that was only a matter of detail. He feared, however, it would be like other matters which were for the public good, that it would be hopeless to expect private individuals to undertake it. This subject, along with the artificial propagation of the better species of fish, and, probably, eventually they might come to that, was a matter which concerned the State more than private individuals, and he thought it would be found very difficult to find private gentlemen so scientific as to go to the very large expense which would be required, without any certainty of recouping themselves or obtaining interest on the money.

The resolution was carried unanimously.

Mr. CORNISH, in reply, having thanked the meeting, said he would make one remark on Mr. Saville Kent's paper, that was with regard to the use of the berry of the lobster. If they could only bring it home to the minds of cooks that the berry of the lobster was absolutely tasteless, and if it had any taste at all it was a slightly unpleasant taste of iron, and that, therefore, it was only valuable as a colouring matter, there might be some hope of putting a stop to the present practice of using it for sauce. He then proposed a vote of thanks to the Chairman for his kindness in taking the chair. He had known him for some years as a practical fisherman, and he was sure a better chairman could not have been selected.

Mr. SAVILLE KENT seconded the motion, which was carried unanimously.

The CHAIRMAN said he could assure the Conference it had given him great pleasure to be present that day, because this question of crustaceans was one which must interest every one. The lobster and crab fisheries had always had a peculiar interest to him, because it was essentially a fishery for poor men. The crabbers generally worked with their own hands alone, and in their own little boats, and were exposed to almost as hard work as any toiler of the sea, so that anything which could be done to protect their interests, or increase the supply of this fish, would be most valuable to the fishing community. With regard to what had been said about legal interference, he might say that in 1877 an Act of Parliament was passed to a certain extent protecting crabs and lobsters, by prohibiting the sale of undersized fish.

The question of berried hens, as they were called, was very much discussed when that Act was passed, and he took a great deal of trouble to get information and evidence with regard to them. It was not the cooks alone who were to blame in causing berried hens to be sent so largely into the market, the fishermen themselves doing it, because the lobsters having berries on them were in as good condition for eating as at any time in the year, and if the sale of berried hens were prohibited, as Mr. Saville Kent remarked, and as he had heard from the fishermen themselves, they would simply evade the law by brushing off the berries. The size of crabs was another question which was very largely discussed, and, as Mr. Birkbeck could bear him out, the people in Norfolk, where crabs were not as large as on the south and west coasts, were in favour of a larger size being named than that which was placed in the Act, viz., 4½ in. across the crab's back. That was such a tiny thing, and contained so little meat, that a very small extension in the size would produce much more valuable food for the table, and the fish would increase its species in an enormously large proportion. With regard to the district which Mr. Cornish had spoken of, where fishing could be carried on for over 200 square miles without doing any harm, he would point out that there was a great natural protection existing there, for that fishing ground was exposed to all the tremendous rollers of the Atlantic Ocean, so that it could not be fished so constantly and incessantly as inshore crab fisheries, and those places around the shore where it was acknowledged on all hands that crab and lobster fisheries required protection.